

What is claimed is:

1. An optical recording method for an optical disc, comprising:
producing a main beam and a sub beam;
forming a main light spot on the optical disc by projecting the main beam on the optical disc;
forming a secondary light spot on the optical disc by projecting the sub beam onto the optical disc at a predetermined distance ahead of the main light spot in a track direction along which the optical disc rotates;
recording a new mark and erasing an existing mark using the main light spot; and
supporting erasing of the existing mark using the secondary light spot during mark recording and/or erasing.
2. The optical recording method as recited in claim 1, wherein an optical erasing power of the main beam, P_{me} , and an optical erasing power of the sub beam, P_{se} , satisfy:
$$P_{me} \leq P_{se}.$$
3. The optical recording method as recited in claim 2, wherein the optical erasing power of the main beam, P_{me} , is an invariable power comprising a predetermined magnitude, and the optical erasing power of the sub beam, P_{se} , is pulse-formed power.
4. The optical recording method as recited in claim 1, wherein the main light spot and the secondary light spot projected on the optical disc are sufficiently separated from each other where the secondary light spot does not affect an area to be recorded on by the main light spot while erasing the existing mark.
5. The optical recording method as recited in claim 4, wherein the predetermined distance between the main light spot and the secondary light spot on the optical disc is greater than a length of a minimum recording mark.
6. An optical recording method for an optical disc, comprising:
forming a main light spot on the optical disc by projecting a main beam on the optical disc;
forming a secondary light spot on the optical disc by projecting a sub beam

onto the optical disc at a predetermined distance ahead of the main light spot in a track direction along which the optical disc rotates;

supporting erasing of an existing mark using the secondary light spot during mark recording and/or erasing by partially erasing the existing mark while emitted at the predetermined distance ahead of the main light spot;

completely erasing the existing mark partially erased by the secondary light spot using the main light spot; and

recording a new mark using the main light spot at a position of the erased mark.

7. An optical recording apparatus, comprising:

a light source unit emitting a main beam to form a main light spot on an optical disc and emitting a sub beam to form a secondary light spot on the optical disc at a predetermined distance ahead of the main light spot in a track direction along which the optical disc rotates; and

an objective lens focusing the main beam and the sub beam on a recording surface of the optical disc,

wherein the secondary light spot partially erases an existing mark and the main light spot completely erases the existing mark and records a new mark at a position of the erased mark during mark recording and/or erasing.

8. The optical recording apparatus as recited in claim 7, wherein

the secondary light spot supports the erasing of the existing mark by partially erasing the existing mark while emitted at the predetermined distance ahead of the main light spot in the track direction along which the optical disc rotates during a recording signal period, and

the main light spot completely erases the existing mark partially erased by the secondary light spot during the recording signal period.

9. The optical recording apparatus as recited in claim 8, wherein the secondary light spot is formed by branching pulse-type light output from the light source unit during the recording signal period, where the secondary light spot comprises a pulse form comprising a same variation as the recording signal.

10. The optical recording apparatus as recited in claim 7, wherein the light source unit comprises:

a light source producing and emitting light; and

an optical branching device branching the light emitted from the light source into the main beam and the sub beam.

11. The optical recording apparatus as recited in claim 10, wherein an optical erasing power of the main beam, P_{me} , and an optical erasing power of the sub beam, P_{se} , satisfy :

$$P_{me} \leq P_{se}.$$

12. The optical recording apparatus as recited in claim 11, wherein the optical erasing power of the main beam, P_{me} , is an invariable power comprising a predetermined magnitude, and the optical erasing power of the sub beam, P_{se} , is pulse-formed power.

13. The optical recording apparatus as recited in claim 7, wherein the light source outputs light comprising power that satisfies:

$$P_t = (P_m + P_s)/\alpha, \quad 0 \leq \alpha \leq 99$$

wherein P_t comprises a total of light power output from the light source, P_m comprises the power of the main beam I, P_s comprises the power of the sub beam II, and α comprises a degradation in light efficiency caused by the branching of light into two beams.

14. The optical recording apparatus as recited in claim 7, wherein the light source unit comprises first and second light sources positioned in the track direction of the optical disc and emitting the main beam and the sub beam, respectively.

15. The optical recording apparatus as recited in claim 14, wherein the first and second light sources operate in synchronization with each other and output light power comprising a same form but different magnitudes.

16. The optical recording apparatus as recited in claim 15, wherein the secondary light spot partially erases the existing mark while emitted at the predetermined distance ahead of the main light spot in the track direction along which the optical disc rotates during a recording signal period, and the main light spot completely erases the existing mark partially erased by the secondary light spot during the recording signal period.

17. The optical recording apparatus as recited in claim 14, wherein the first and second light sources operate independently, where the first light source

outputs pulse-formed recording light power and the second light source outputs DC erasing light power.

18. The optical recording apparatus as recited in claim 17, wherein the secondary light spot comprises the DC erasing light power from the second light source and partially erases the existing mark, and the main light spot comprises the DC erasing light power from the first light source and completely erases the existing mark partially erased by the secondary light spot, providing sufficient erasing ratio.

19. The optical recording apparatus as recited in claim 14, wherein an optical erasing power of the main beam, P_{me} , and an optical erasing power of the sub beam, P_{se} , satisfy :

$$P_{me} \leq P_{se}.$$

20. The optical recording apparatus as recited in claim 19, wherein the optical erasing power of the main beam, P_{me} , is an invariable power comprising a predetermined magnitude, and the optical erasing power of the sub beam, P_{se} , is pulse-formed power.

21. The optical recording apparatus as recited in claim 7, wherein an optical erasing power of the main beam, P_{me} , and an optical erasing power of the sub beam, P_{se} , satisfy :

$$P_{me} \leq P_{se}.$$

22. The optical recording apparatus as recited in claim 21, wherein the optical erasing power of the main beam, P_{me} , is an invariable power comprising a predetermined magnitude, and the optical erasing power of the sub beam, P_{se} , is pulse-formed power.

23. The optical recording apparatus as recited in claim 22, wherein the predetermined magnitude of the invariable power is 2.2mW to 2.4mW.

24. The optical recording apparatus as recited in claim 7, wherein the main light spot and the secondary light spot projected on the optical disc are sufficiently separated from each other where the secondary light spot does not affect an area to be recorded on by the main light spot while erasing the existing mark.

25. The optical recording apparatus as recited in claim 7, wherein the predetermined distance between the main light spot and the secondary light spot on the optical disc is greater than a length of a minimum recording mark.

TECHNICAL FIELD